

The seeds classified in this manner were placed in a yield trial of four replications during the rainy season (spring-summer) of 1962/63, giving the results shown in Table 2. Size had no effect on initial stand of either variety. For Rico-23, plant height and final stand for the "small" seed entry were significantly lower than the other two sizes, while for yield the only significant difference encountered was between "small" and "large" seed. In the variety Manteigao-Fosco-11, the only significant difference obtained was in plant height, with the "small" seed giving rise to shorter plants. If the lower final stand for the "small" seed of Rico-23 was not the cause of the lowered production, it probably was at least a contributing factor.

The data appear to indicate that, at least for small seeded varieties such as Rico-23, yield could vary according to size of the planted seed, which in turn depends on conditions under which the seed was produced.

Table 2

Effect of Seed Size On Yield, Stand and Plant Height in Two Bean Varieties

Seed Size	Yield Kg/Ha	Initial Stand %	Final Stand %	Plant Height (*) cm.
Rico-23				
Small	603	94	84	29.2
Medium	684	96	96	34.5
Large	844	98	96	35.2
Manteigao-Fosco-11				
Small	620	95	92	28.5
Medium	653	94	94	35.2
Large	664	96	94	34.7

(*) Taken two months after the planting.

This experiment is considered to be very preliminary in nature. The study is being continued by making a second planting in a drier season (summer-fall), when conditions are normally less favorable to the development of bean plants.

Green-seeded Downy Mildew-Resistant Fordhook Lima Beans

R. E. Wester

Three new green-seeded downy mildew-resistant Fordhook lima beans (U.S. 561, 861, and 1061) showed considerable promise in Maryland, New Jersey, and Long Island in 1961 and 1962. They resisted downy mildew (*Phytophthora phaseoli* Thaxt.) strain "A" which in some years causes considerable damage to lima beans in Maryland, Delaware, New Jersey, Pennsylvania, and New York. Their yields equalled or exceeded those of Fordhook 242. Plants of the new lines are slightly shorter and more compact than those of Fordhook 242 and have short racemes that produce a heavy crop of pods below the foliage, thus preventing flower drop which often results from excessive heat, drought, wind, and rain. Pods reach prime marketable condition 4 to 6 days later than Fordhook 242 and remain in this condition

several days longer. The pods are approximately as long and thick as Fordhook 242 but not quite so wide. The shelled beans are slightly smaller than those of Fordhook 242 and darker green in frozen pack. The quality of the cooked beans is excellent.

Resistance to *Thielaviopsis basicola* in Bean

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Our present root rot breeding material derives its resistance from two sources: (1) N 203, *Phaseolus vulgaris* P. I. 203958, and (2) an interspecific cross with *P. coccineus*. This phase of the program was started by Dr. T. L. York about 1949. Screening for root-rot resistance has been conducted in the past primarily in a root-rot test plot in which beans have been grown almost every year since it was established about 40 years ago. Although this test plot was originally artificially infested with *Fusarium solani* f. sp. *phaseoli*, and major emphasis has been placed on the development of material with resistance to this pathogen, it is to be expected that the continual cropping of the plot to beans has resulted in the build-up of the inoculum level of other root-rot pathogens.

Recently it was discovered that both of our two sources of root-rot resistance, *P. coccineus* and N 203, are resistant to *Thielaviopsis basicola*. Further tests reveal that much of our *Fusarium* root-rot resistant material also is resistant to this pathogen. It appears that screening for root-rot resistance under these conditions probably has resulted in the selection for resistance to *Thielaviopsis* as well as resistance to *Fusarium*. It is recognized, of course, that there may actually be an interrelation between the two.

Resistance to *Thielaviopsis* appears to be more sharply defined than resistance to *Fusarium*. Preliminary tests indicate that reactions fall roughly into four categories:

1. Highly resistant (*P. coccineus* and some breeding lines)
2. Resistant (N 203 and many breeding lines)
3. Susceptible (Red Kidney, Contender, and some breeding lines)
4. Very susceptible (Yellow Eye and Tendercrop)

There may not be a great difference between reactions 1. (highly resistant) and 2. (resistant) nor between 3. (susceptible) and 4. (very susceptible). But, there seems to be a real and distinct difference between reactions 2. (resistant) and 3. (susceptible).

Although it is a virulent pathogen on bean, the culture of *Thielaviopsis basicola* employed in these tests was originally isolated from tobacco. The possibility, in fact the probability, of strains of the pathogen is recognized. It is hoped that these lines can be tested by other workers under varying conditions. As this phase of the program is quite new, our seed stocks of highly resistant breeding lines will be in very short supply until they can be increased this summer. We will be glad, however, to supply seed samples to any interested workers in so far as our supply permits.